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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/766,477	01/19/2001	Klan Teng Eng	TI-22944.2	2137

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Mark E. Courtney
Texas Instruments Incorporated
P.O. Box 655474, MS 3999
Dallas, TX 75265

EXAMINER

MITCHELL, JAMES M

ART UNIT	PAPER NUMBER
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2813

DATE MAILED: 06/02/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 09/766,477	Applicant(s) ENG ET AL.	
	Examiner James M. Mitchell	Art Unit 2813	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
 - If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
 - If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
 - Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 9 March 2005.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 21-25 and 27-38 is/are pending in the application.
- 4a) Of the above claim(s) 29-36 and 38 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 21-25, 27, 28 and 37 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

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DETAILED ACTION

1. This office action is in response to arguments filed March 9, 2005.

Election/Restrictions

2. Newly submitted claims 38 is directed to an invention that is independent or distinct from the invention originally claimed for the following reasons: the claims are drawn to a product while the previously rejected claims are drawn to a process.

- 3 Since applicant has received an action on the merits for the originally presented invention, this invention has been constructively elected by original presentation for prosecution on the merits. Accordingly, claim 38 is withdrawn from consideration as being directed to a non-elected invention. See 37 CFR 1.142(b) and MPEP § 821.03.

Claim Rejections - 35 USC § 102

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

5. Claims 21, 22, 24, 25 and 28 are rejected under 35 U.S.C. 102(b) as being anticipated by Cotues et al. U.S. 5,239,447).

6. Cotues (Fig 4, 5) discloses a process of providing a high density module produced by a process comprising the steps of: providing a circuit board (44) having a substantially planar top surface for connection to at least one integrated circuit package

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(40,); providing an integrated circuit package having a pair of opposing major surfaces (Regions near 40,84) and at least one edge surface (region near 78) disposed between said opposing major surfaces, one of said at least one edge surface having at least one electrical terminal (48) disposed thereon; and electrically connecting (i.e. terminal in contact with items 24, 46) said at least one electrical terminal on said at least one edge surface of said integrated circuit package to said top surface of said printed circuit board at an acute angle with said top surface of said printed circuit board; (cl. 22) a step of electrically connecting at least two said integrated circuit packages to said circuit board at a said edge (i.e. electrical contact formed under edge; Fig 4); (col. 24) solder columns (Fig. 1, item 13) between said integrated circuit and said top of said circuit board; (cl. 25) further including the step of integrally attaching at least three tabs (pads, 4, 24, 54 etc. are projections used to identify/align package and therefore is a tab) package to said circuit board (cl. 27) said package is further defined as being connected at an acute angle between 30 and less than 90 degrees to said circuit board; (cl. 28) wherein said at least one edge surface (i.e. surface crossing to parallel surfaces; shown in Fig 5) is four edge surfaces (Fig 2), each of said four edge surfaces disposed between said major surfaces (parallel surfaces (i.e. regions close to lines indicating 40,84) to form a closed package with said major surfaces.

Claim Rejections - 35 USC § 103

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the

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invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

8. Claims 27 and 38 are rejected under 35 U.S.C. 103(a) as being unpatentable over Cotues et al. (U.S. 5,239,447).

9. Cotues discloses the elements stated in paragraph 6 of this office action and further discloses a high-density module (Fig. 4) where its package is connected to its board less than 90 degrees ("non orthogonal"; Col. 2, Lines 64-65), but does appear to show explicitly that its angle is between 30 and less than 90 degrees. In any event the range, since the general conditions of applicant's invention is disclosed, it would have been obvious to one of ordinary skill in the art at the time the invention was made to form the structure of Cotues 30 or above, since it has been held that where the general working conditions of a claim are disclosed in the prior art, discovering the optimum or working ranges involves only routine skill in the art. *In re Aller*, 105 USPQ 233 (CCPA 1955).

10. Claims 21-25, 27, 28 and 38 are rejected under 35 U.S.C. 103(a) as being unpatentable over Suzuki et al. (U.S. 5,726,492) in combination with Fujisawa et al. (U.S. 6,094,356).

11. Suzuki (Fig 2A, B) discloses a process of providing a high density module produced by a process comprising the steps of: providing a circuit board (32) having a substantially planar top surface for connection to at least one integrated circuit package (25₁); providing an integrated circuit package having a pair of opposing major surfaces (i.e. vertical surfaces) and at least one edge surface (i.e. horizontal portion) disposed

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between said opposing major surfaces, one of said at least one edge surface having at least one electrical terminal (30) disposed thereon; and electrically connecting (i.e. 33) said at least one electrical terminal (30) on said at least one edge surface of said integrated circuit package to said top surface of said printed circuit board; (cl. 22) a step of electrically connecting at least two said integrated circuit packages to said circuit board at a said edge (25₂); (col. 23, 24) with a step of disposing solder columns (33) between said integrated circuit and said top of said circuit board between their terminals (30 & contact under ball on board, 32; not shown); (cl. 25) further including the step of integrally attaching at least three tabs (pads, 30 & contact under ball not shown. are projections used to identify/align package and therefore is a tab) package to said circuit board; (cl. 28) wherein said at least one edge surface (i.e. horizontal portion) is four edge surfaces (i.e. horizontal portion is rectangular; Fig. 11), each of said four edge surfaces disposed between said major surfaces to form a closed package with said major surfaces.

12. Suzuki does not show its package connected to its board at an angle between 30 and less than 90 degrees.

13. Fujisawa (Fig. 3) teaches connecting a package at an acute angle less than 90 degrees.

14. It would have been obvious to one of ordinary skill in the art to connect the package of Suzuki at an angle less than 90 degrees in order reduce the height of the device as taught by Fujisawa (Col. 7, Lines 3-5).

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15. With respect to the angle being between 30 and less than 90 degrees, since the general conditions of applicant's invention is disclosed, it would have been obvious to one of ordinary skill in the art at the time the invention was made to connect the package of Suzuki between 30 and less than 90 degree, since it has been held that where the general working conditions of a claim are disclosed in the prior art, discovering the optimum or working ranges involves only routine skill in the art. *In re Aller*, 105 USPQ 233 (CCPA 1955).

Response to Arguments

16. Applicant's arguments with respect to claims have been considered but are moot in view of the new ground(s) of rejection. In an effort to expedite prosecution of this application, examiner has addressed relevant arguments.

17. Applicant contends that Cotues does not show a terminal on an edge surface of its package. Examiner disagrees. The solder provides an electrical signal to a package and therefore is an electrical terminal. Because applicant does not affirmatively claim that the terminal along the package edge provides electrical contact for the device immediately above the edge surface within the opposing major surfaces. Cotues disclosure of a terminal in contact with an edge between opposing surfaces that provides contact for an adjacent package is within the broad scope of applicant's claims.

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18. With respect to applicant's argument's pertaining to a proposed interference.

Because the interference related to a non-elected invention, the argument has no merit regarding the pending claims and is deemed moot.

Conclusion

19. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. The prior art show terminals formed on an edge of a package.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to James M. Mitchell whose telephone number is (571) 272-1931. The examiner can normally be reached on M-F 8:00-4:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Carl Whitehead Jr. can be reached on (571) 272-1702. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).


CARL WHITEHEAD, JR.
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2800

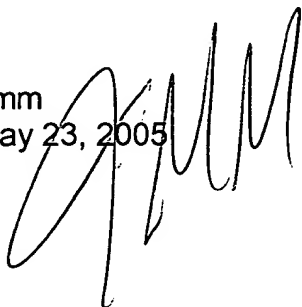
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Jmm

May 23, 2005

A handwritten signature in black ink, appearing to be 'Jmm', written over the date 'May 23, 2005'.